

**ABSTRACT OF THE DISCLOSURE**

An optical element has a substrate having or not having a channel for optical waveguide; and a material which has a refractive index higher than that of the substrate and is filled in the channel for optical waveguide or is disposed on the substrate; wherein

the refractive index in a part of the material varies substantially periodically or is substantially continuously monotone increasing or decreasing in the direction of light propagation.

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